Cooperative Problem-Solving in the Interactions of Airline Dispatchers and Flight Crews

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Overview

A previous study of flight replanning decisions by air transport pilots highlighted the increasing interdependence of flight crews and ground-based operations control staff to ensure safe and efficient flight operations. Although the Pilot in Command has ultimate authority in making decisions, it is clear that Dispatchers and other ground-based personnel are an important resource to support planning and decision-making by the flight crew.

To examine this interdependence further and to identify areas for improvement, a one-day focus group was held to discuss the interactions of airline Pilots and Dispatchers. Based on the discussions of participants from eight airlines, a variety of important issues were identified.

Three major classes of issues emerged, dealing with communication, training and workload. Communication was seen as the biggest problem and included the following: Difficulty in initiating communication links, poorly formatted messages in which critical information becomes buried, inadequate procedures during the handover of authority, and use of confusing and opaque abbreviations and acronyms. Discussions also identified weaknesses in the training of Dispatchers, Maintenance personnel, Pilots and Air Traffic Controllers, especially training that relates to interactions among these groups and how they can support each other. A final issue was concern with the effects of Dispatcher workload, particularly during bad weather when holdings patterns or diversions become necessary.

Potential areas for improving the current system and for future research were identified.

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I. Introduction

Effective coordination between flight crews and airline Dispatchers plays a major role in assuring safe, efficient flights. In order to better understand the interactions of Pilots and Dispatchers, and to identify areas for improvement, a focus group was held in which eight Pilots and eight Dispatchers from eight airlines met to discuss issues and problems that they and their colleagues have experienced. This report highlights the problem areas and potential solutions that were identified during this discussion.

Methods

For the first three hours of the focus group, the Pilots met separately from the Dispatchers. Both groups were given the following scenario and asked to discuss the likely patterns of communication and interaction in such a situation, and to identify potential problems with these interactions.

Enroute Scenario: A three engine widebody aircraft is flying from a U.S. East Coast gateway to London via the NAT tracks. On takeoff and on climbout, the Captain noticed that the number 2 (center) engine fuel low pressure light started blinking. At this point, the plane has leveled off at 10,000 and is 30 miles from its originating airport.

Following their separate discussions of this scenario, the Dispatchers and Pilots then met together. The following questions were used to stimulate discussion during this joint meeting.

1. What do the Pilots in your airline currently expect from Dispatchers? (What tasks do they perform? What information do they provide? How and when are these tasks initiated?)

2. What would the Pilots in your airline like from Dispatchers?

3. What do the Dispatchers in your airline currently expect from flight crews?

4. What would the Dispatchers in your airline like from flight crews?

5. What are specific examples of problems that have arisen in interactions of flight crews with operations control staff?

6. What changes would you recommend to improve the interactions of Dispatchers and flight crews? What do you believe would be the impact

of these changes? Of the changes identified, which are likely to be most important?

7. What do Pilots feel should be included in the rewrite of FAR 65 to improve of Dispatcher training having to do with Pilot-Dispatcher interactions?

8. What should be included in the training of Pilots regarding interactions with operations control staff?

Finally, toward the end of the session the following list of possible causes of problems was shown. Participants were asked to evaluate the contribution of these causes to actual problems and to identify any other causes of which they were aware.

Possible Causes of Problems

Lack of awareness/training (the Pilot isn't aware of what the Dispatcher could do for him/her or vice versa).

Difficulty in communicating with the Dispatcher (the Pilot has difficulty contacting or interacting with the Dispatcher or vice versa).

Inefficiencies (it's faster to deal directly with someone other than the Dispatcher).

Ineffectiveness (the Dispatcher isn't providing useful assistance).

Conflict avoidance (the Dispatcher may give advice that disagrees with the Pilot's judgment).

Workload (it's extra work dealing with the Dispatcher), especially when a problem has arisen with a two-person flightdeck.

Habit (the Pilot is used to talking to X in other situations, so he/she does so again in this situation).

Comfort (the Pilot is comfortable talking with X, so he/she prefers to talk with X in this situation).

II. Problems with Communications

Many of the important issues that arose dealt with communication problems, including difficulties with initiating and involving all of the relevant parties in communications and with inadequacies in the communication of important content.

Communication During Enroute Problems

As the figure on the following page illustrates, there are many parties who should communicate under both routine and non-routine circumstances. Furthermore, there are many unique methods in use at the different airlines for establishing communication between these parties. At some airlines, for example, when a problem arises while enroute, the pilot contacts the Company Radio Operator, who then handles the workload associated with getting appropriate company personnel (Dispatch, Maintenance, etc.) on the radio. One Pilot described such a scenario for his airline:

> "It depends on the timing of the situation. In this case, if you've got time, you get back to your Dispatch through what we call [The Company] Radio, and we would get the Maintenance Coordinator and the Dispatcher on the line in a matter of seconds."

For some airlines, another aspect of communications involves providing the appropriate Dispatcher with a silent listening capability so that the Dispatcher automatically hears any conversations involving the flight crew:

> "If we ever call to the Dispatcher, he's kind of the center point. If we want Maintenance, we'd call [The Company] Radio and ask for Maintenance, but the Dispatcher's always on the line with a silent listening watch. In other words, he's always called if we call anybody else."

Further examples of communication patterns are illustrated in the discussions below.

Discussion 1. The following interaction arose among a group of Dispatchers while discussing the scenario presented during the morning session.

> "The crew would call Dispatch and probably have Dispatch get Maintenance on the line to try to discuss any options that they think, if this thing had a history possibly, just an indication problem, and then go from there. Get their opinions on if its just an indication problem, are there any other parameters that are starting to fluctuate also that could be the cause of it. Maybe there really is something wrong with the fuel low pressure, not just the light blinking."
>
> Moderator: "So your flight crews would call directly to Dispatch, not to Maintenance?"

"We go through Dispatch first. That way crews don't go right to Maintenance and we don't know about it. Our Maintenance Control Department is hooked in on the same system."

Moderator: "Are they physically co-located?"

"Yes, just a glass wall separates us."

Discussion 2. In response to the same scenario, two of the Pilots outlined another communication path.

"The first thing we're going to do if we decide not to go is talk to ATC. We're going to stop our climb and we're probably going to come back. We have to go to flight dispatch by law 'cause we're going to divert basically. We're going back to the departing airport. However, a call to ATC can do wonders - tell [ATC to inform] the Company we're coming back, we'll talk to them when we're on the ground. We're only 10,000 feet, 30 miles, and we have to get ready for landing right now. If we decide it's a, well, this is not really an emergency. The airplane can fly all day long on two engines, but still you're gonna come back and you want to expedite it."

Similarly, Dispatchers from some of the airlines indicated that, based on their company's policy, inclusion of the Dispatcher in a conversation is at the Pilot's discretion.

"The crew has an option to call Maintenance or the Dispatcher. ... The Dispatcher may not always be the first one in on the problem."

"Many times at this point the Captain is looking to solve his own problem. We've just taken off, yes, we have a low pressure light flickering. If there's no other corroborating indications in the cockpit, now it's OK. Let's call Maintenance and find out what this is really all about. Is it a killer item or does it look like everything's ready to go? You could call Dispatch, and Dispatch could put in a phone patch and have a three way conversation. ...Or you might call Maintenance directly to find out what's happening."

"When I contact Maintenance, many times I contact Maintenance through an ARINC airpatch. If I'm in between two stations and not in a radio reception area, I talk to Maintenance totally separately, and no Dispatcher will ever hear what I'm saying."

"We give the crew the option of contacting the Maintenance Controller or the Dispatcher. If it is a serious irregularity we would like to have the Dispatcher involved. ... The cockpit crew has to decide which resource to bring up. We're

> trying to make it a cultural thing to go through Dispatch for anything that is serious."

A variety of concerns were raised during this discussion about such patterns of communication in which Dispatchers are left out:

> "If they're on the ground, most of our guys will talk to Maintenance first through a telephone line. Dispatch is not in that loop."
>
> "It's difficult for us [Dispatchers] to have 100% accountability when we don't get 100% of the raw information out there. A lot of time crew deferrals go directly from the crew to the maintenance controller and never touch us."

Discussion 3. A third discussion focused on the effects of physical location on communication.

> "We used to have our team all split up, but within the last two years, we've brought it all together and formed this horseshoe type operation where everybody can sit and look at each other and talk back and forth. It's given us the opportunity to have immediate reaction. Before, you had to call someplace where Maintenance was and it was slower to get the information back into the cockpit, but now it seems to work a lot better with everybody right there to listen to the problem."
>
> "Our Ops people, Dispatch, are not co-located with Maintenance. ... Later this year we're going to move to an Ops center [where they will be together]. There are compelling reasons, I think, for them to be co-located in the same area."
>
> "In this case, if we couldn't take care of the problem in the cockpit, then we start looking for outside resources. We'd get a hold of our Dispatch team, which is sitting in the middle of our Systems Operational Control, which has got all kinds of other people right there to help us work through the problem. There's Maintenance, crew planning; there's marketing; there's a whole big bunch of people that sit in kind of a horseshoe situation for each fleet. They're all together. So when this comes up on the radio, then we get that whole team working on the problem. In this case, maybe Maintenance would have some input so that we could take care of the problem right away instead of going through normal checklist procedures."

Communication During Enroute Problems—Summary

Because they arose in a group discussion rather than during interviews with individuals, the above discussions are sketchy regarding details. They do, however, make it clear that there are huge differences in the ways that flight crews at different airlines decide *who* to talk to, *how* to reach them, and *when* to contact them when a

problem arises while enroute. The effect on communication of the physical location of the parties on the ground (e.g., Maintenance and Dispatch) was also raised.

Finally, it was clear that workload levels in a two-person cockpit can significantly interfere with ground communications, particularly when abnormal events arise.

Other Communication Problems

Several other factors were identified that impede transmission of important messages.

Lack of Salience of Important Information on Flight Plan. In many cases, important information is given to the flight crew in their initial flight plan, but is buried among other types of information, causing the flight crew to miss it. Several Pilots related instances of this type of communication failure.

> Pilot: "You get a flight plan that's about 9 feet long. We would have a note saying it's restricted to Flight Level 350, but ...it's in a notes section which is buried with other comments and that's an issue with us right now. There's no prioritization of those things. It's a real important issue I think."

> Pilot: "So, X, who's my Dispatcher, is relying on this guy who works in Operations to put together his piece of information. He might have wanted it to come in a certain order so it makes a lot of sense and it gets rid of the business of having to sort through 37 feet worth of information in order to see the one note that he really wanted me to see. I missed it, so I actually go out; I load the aircraft; we're ready to go, and all of a sudden I find a call from Dispatch just two minutes prior to push because he's been busy with other things: 'We were supposed to talk about this fuel-up.' And I went: 'I didn't see it. Where is it?' 'It's back there on page 37.' 'You mean they didn't put that on top?' 'No, well, because the operations agent didn't see it.' The whole process here is, I'm working through a whole network of people who can create, unintentionally, a barrier to communication."

These comments reflect the feeling that critical information should be made more salient in the flight plan which is issued to the flight crew. At present, at some of the airlines it is much too easy for a crew to miss such important information.

Shift Changes. Shift changes or transfers of authority present special challenges to all parties, especially when information critical to operations does not get relayed from one Dispatcher to another during a shift change, or from an inbound crew to an outbound crew. This often results in errors and inefficiencies later in the flight, putting the flight crew in a difficult situation.

> Pilot: "Three months ago we had a 757, [which flew] two legs prior to landing in Salt Lake with pressurization problems. In both cases the crew had to do

modified rapid descent, if you will, because ...they lost pressurization. The airplane had a pack inoperative, [an] APU inoperative, and [one of two] pressure controllers inoperative. You can go with one [pressure controller]. You're limited to 35,000 feet because of the pack, however, [and] the crew changed at Salt Lake. The outbound crew briefed the inbound crew. All the focus was on the pressure controller. Maintenance worked on it, and the crew checked the MEL and pressure controller - no restrictions. They missed a note in the flight plan, however, which said that pack was inop, and they were limited to 35,000 feet. The flight plan was, however, for 39,000 feet. ... Our flight planning computer at the present time can violate MEL restrictions. The Dispatcher would normally catch that. There was a shift change about that time, and the outbound Dispatcher and the inbound Dispatcher perhaps didn't communicate about this, because the inbound Dispatcher was unaware of the problems this airplane had had. So the crew missed it too, went to 39,000 feet, and had a pressurization problem, and later found a maintenance problem with a stuck valve in the P and E compartment. Point of all that is that there were some issues here where the Dispatcher was held culpable along with the crew. And I think the shift change and the workload and those sorts of things were issues here."

Dispatcher: "Being an old dispatcher, when I started things were not in the computer. A turnover was a lengthy document that you signed and went down item by item - what ILS's were out of service, what runways were closed ... Recently, all of that information is included in a database in a computer, and I know I've received turnovers that have a big smiley face and saying: "Have a nice day!" with the assumption that I would check this database and find all this out. And I think there is a definite lack of standardization of turnovers."

Dispatcher: "What constitutes a thorough briefing? Briefings, shift turnovers, vary as much as people vary. Some people hit the minimum bullet point headings and some people keep very thorough logs."

Pilot: "There needs to be a Dispatcher briefing when one Dispatcher goes off duty tells the next guy: 'This guy's coming in with a problem in two hours.' And that doesn't happen sometimes."

The comments above reflect the complexity of passing information efficiently and effectively between changing shifts. They also suggest some of the hazards associated with the introduction of new technology without carefully considering procedures to assure that important tasks are still completed adequately.

Failures to Communicate in a Timely Fashion. It is important that information be passed between groups quickly enough that they can act on that information. The discussions indicated that there are a number of circumstances where this fails to occur. One example of this dealt with looking ahead when equipment problems exist:

> Pilot: "One of the things we're working on is a way to alert our SOC team ... of an inbound problem. A common one I can think of is, if you had an engine anti-ice valve that didn't open and you're coming into [an airport] where the weather's clear and it doesn't make any difference, but the plane's going to depart to go to [an airport] that's got icing problems there, to alert this SOC team that: "Hey, we've got this valve that doesn't work now." Then ... they can say: 'This is going to be a real problem because the next leg is going to go to [an airport] where we need that valve to work.' So they can start maybe looking at different airplanes or make sure Maintenance is there right away with the part or whatever, ... rather than waiting for the new crew to show up and say: 'Hey, we can't take this thing.'"

A second example focused on looking ahead when planes are in a holding pattern:

> Dispatcher: [Early warnings] "become extremely helpful because you're down there prioritizing the flights and which one you're going to handle first and what order you're going to handle them in. ... I can't get enough information from my guys holding up there. They all call in when fuel is up or when time's up and then you're really limited on your options ..."
>
> Dispatcher: "A lot of times pilots will call when their EFC is up or when their fuel is up or when a decision has to be made. For those equipped with ACARS, [I'd like them to send] a simple message down ahead of time saying: 'We're going in [a holding pattern] for 40 minutes, that's about all the fuel we have.'

Thus, there appear to be a variety of problems in communicating time-critical information to Dispatch. The net result is that opportunities to act on the best solutions may be missed because it is too late by the time Dispatch or some other member of the SOC team is alerted.

Ease of Communication. Several Pilots suggested that often they would like to contact their Dispatcher during a flight, but fail to do so because establishing that communication link is too difficult.

> Pilot: "... The communication takes too long from my standpoint. What I would love is one button that I could push, that when things start getting interesting, I push that button and everything I say to ATC gets downloaded say to Operations and to Dispatch and so forth. 'Cause as it is now, with two people in the cockpit, somebody's got to fly the airplane and talk to ATC. The

other person is now trying to get in on the frequency, decide who to talk to, decide who to ask for."

Pilot: "[Even in a situation that's] a no-brainer, it can be extremely busy. I had a pressurization problem out of Denver - going East. The airplane just wouldn't pressurize. Piece of cake, right? It took us about 45 minutes to take care of this problem and we were very, very busy with a two man airplane."

Pilot: "The communication problem seems to be one where I can see a big bottleneck in the ease, the user friendliness of this thing. If it's easy to talk to Dispatch, to Maintenance, bang, bang, bang, probably you will do that more, but there's an expediency here, where you know it's going to take time to get through. You've got the world around you, you've got everybody else to take care of, so you're going to look for short-cuts. ... There's a bottleneck there that I see as an industry problem."

Pilot: "We have frequencies that we could talk to our Dispatchers with, but there seem to be filters and bottlenecks there, taking time to get through it. And time moves rather rapidly when you encounter even minor mechanical difficulties."

These problems with the ease in establishing communication links are especially serious in aircraft with 2-person crews, as their workload may preclude them from talking to Dispatch and Maintenance in a timely fashion.

Overreactions of Dispatchers. A later discussion revealed another reason why a flight crew may fail to talk to the Dispatcher: They believe the Dispatcher may overreact.

Pilot: "There's a human factors problem here that would preclude some of us, we Pilots, from calling Dispatch. [I know of a recent flight which] landed under an amber alert and ... didn't know anything about it and ... had to write it up. They had a suspected hydraulic problem and they called Dispatch and Dispatch had equipment standing by, and nobody else knew [that Dispatch had requested the emergency equipment]. There was a miscommunication. So some of us may not want to call Dispatch 'cause they're going to get the equipment out whether we want it or not." [An amber alert is less than an emergency, but it's some kind of abnormal condition.]

Another Pilot: "We've had that happen at [our airline], where a crew has discussed something or other at Dispatch, the Dispatcher thinks about it and later decides: 'We ought to do a precautionary.' The crew taxis in, the emergency rescue support folks are taxiing along, the fire chief shows up on the jetway and the crew says: 'What are you doing here? I didn't realize you were coming for us.'"

Although these particular comments focus on "overreactions" by Dispatchers, they suggest a broad class of problems that may exist and that merit further investigation: Failures by flight crews to contact Dispatch because they think the input from the dispatcher might not match what they want to hear or do. Related is a concern over the need for a shared understanding of what situations warrant unilateral Dispatcher requests for emergency assistance.

Unclear Abbreviations. Another barrier to effective communication is the use of abbreviations that impede the transfer of information, and add to the workload of the flight crew.

> Pilot: "Does anybody else have a problem with Dispatch and Maintenance and their use of abbreviations and acronyms?"
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> Pilot: "Yes, and Weather too."
>
> Pilot: "We have a lot of fun trying to interpret. That's a good cruise game. Really. It works real good to keep your attention trying to figure out what they're talking about."

Other Communication Problems—Summary. As discussed above these problems range from poor formatting of information, causing critical pieces of information to be buried, to inadequate briefings during shift changes, to difficult procedures for initiating communications. In addition, there is a problem with flight crews sometimes deliberately avoiding discussions with Dispatch because they feel that the Dispatcher's response may be inappropriate or less than helpful.

III. Insufficient Knowledge or Training

All of the participants agreed that there are significant problems with the adequacy of the training for ATC staff, Pilots, Dispatchers, and Maintenance.

ATC Staff

Of particular concern to both the Pilots and Dispatchers was a frequent lack of awareness by ATC (and the FAA in general) about the actual aircraft capabilities and limitations (or an inability of the ATC system to adequately make use of such knowledge):

> Pilot: "The FAA doesn't know what our different airplanes can do."
>
> Pilot: "ATC is working airplanes and they don't know which airplanes can do what."

Dispatchers

Several Pilots expressed similar concerns about a lack of knowledge by Dispatchers about aircraft capabilities (or a failure to use their knowledge appropriately):

> One Pilot suggested: "A lot of the misunderstandings have to do with not knowing what's available to Dispatch or not knowing what's available to the crew. I think a lot of us sit around here with different levels of equipment. I'm on a 74 or something with no ACARS and we're all monochrome radar and it's old parts. And the next crew you'd be talking to would be a 767, so everything's up to date and would be an entirely different level, and somebody in the other corner would be a DC9-30 with nothing that works. ... That is where you get most of your problems [dealing with different types of aircraft] because the Dispatch group, unless they've seen all this, don't have the appreciation for what we [the flight crew] have to work with."

> Pilot: "In one case we might have a bleed air problem which affects our anti-icing. Well, that certainly is an example where the Dispatcher should not have used this airplane to fly to Buffalo, N.Y. during bad weather."

Related to this concern over the familiarity of Dispatchers with the capabilities of different aircraft is a concern over the training of Dispatchers in dealing with MELs:

> Pilot: "A comment that I've been getting from our fellows on Dispatch is that they need more information on MELs, ... the meshing of more than one MEL. Dispatch wanted more background on the interrelationship of more than one MEL at a time. I think that's been left out historically forever in the FAA's view. It's always been one failure, no compound failures. I would make that a priority."

There was also a concern about the adequacy of training for Dispatchers dealing with international flights:

> Dispatcher: "Dispatchers need an international rating on their dispatcher's license. ... The international theater is totally unique from a domestic operation."

Pilots

Both Pilots and Dispatchers expressed some concerns about training for Pilots.

> Pilot: "The Pilots, the Crew, and especially the Captain, is going to make all the difference in the world as to who gets notified. It would not surprise me

at all to have Captain A land with the flight attendants, Dispatch, Flight Control and Operations and everybody in the world knowing what's going on, and Captain B come in and arrive at the gate and Operations might have known they were coming, but Dispatch doesn't know, Maintenance doesn't know, and the flight attendants and the passengers don't know either. That's unfortunate, but it happens."

Dispatcher: "Some crews tend to look at us as clerical people - we're just sitting there banging out paperwork, without fully realizing that we're operational people and that we do have information they don't have, and technically, can't have. [Furthermore, we] can offer tactical information if they will utilize it."

Dispatcher: "I would love nothing more than to see every line pilot be mandated to visit, tour the operations control center that he or she is in contact with on the ground."

Dispatcher: "They (pilots) don't see the bigger picture that we do."

Dispatcher: "I think [it would help] if pilots knew what we do daily for a living."

Dispatcher: "I think there should be some requirement that Pilots spend X number of hours becoming familiar with their own airline operations centers, their SOC's. In light of how fast our technology's changing these days, I think it's imperative every year."

A Dispatcher suggested: "I don't think there is a consistent awareness industry wide as far as what the true role of Pilot/Dispatcher authority is. Some crews think we're trying to fly their airplane. ... There are always things that they may not immediately be aware of. ...What is best for their one airplane is not what is best for the airline at large."

Another Dispatcher reported: "We had an 8:30 departure going someplace on time recently. We canceled it and we held the 8:00 for 20 minutes to pick up passengers off of it. It was a clear move passenger-protection wise, aircraft routing-wise, all the other parameters that we look at, except for the Captain of that flight that got delayed for 20 minutes. He had been making up time for three or four legs. He had fought to make up time; he was back on time and here we were delaying him personally. We had picked his name out of a hat and said, 'He's it, by golly.' That was his reaction to it. "

Thus, a number of concerns were raised about the awareness of Pilots concerning the roles and capabilities of Dispatchers, and about the factors considered by Dispatchers when making recommendations. (These concerns, although stated as problems with

the training of Pilots, could also be considered issues for Dispatcher training - emphasizing the need to fully communicate the basis for a recommendation along with the recommendation itself.)

Another concern over Pilot training had to do with their understanding of the roles and responsibilities of different parties on the ground. It was indicated that such misunderstandings have actually lead to inappropriate diversions and maintenance decisions:

> Dispatcher: "We've had cases of varying awareness levels. [As an illustration, we had a case where a plane was being held because of] fogbanks over London. ... Somehow they got a hold of a station manager over there, and the station manager told them, the crew, what they thought the best alternate airport would be for getting them turned in and out on a quick basis. And this crew diverted on the basis of what a station manager at a European station told them. A voice on the ground told them to go to Prestwick."

> Dispatcher: "Technology has overtaken the procedure. At one time the radio was in the hands of the Dispatcher. The Pilot only talked to ATC by way of the Dispatcher. Technology now allows the cockpit to communicate directly with many people. ... In some airlines, they have dealt with that problem by making sure that the Dispatcher is in on any conversation that takes place. Many Pilots, however, do not understand who 'speaks for the company'. Sometimes, an inappropriate maintenance decision in Detroit ... is relayed to the cockpit as the company's wishes. I think it's a real important question here to see how the Dispatch procedure has been outstripped by the ability that every one has [for communication]."

In summary, these comments suggest a number of areas where Pilots may not receive adequate training on the role of the Dispatcher or the tools and resources that are available to Dispatch.

Maintenance

Both Pilots and Dispatchers were concerned that Maintenance personnel did not have the training necessary to discuss potential decisions and actions in terms of the bigger picture.

> Pilot: "I agree totally that the Maintenance people don't have the perspective that the Pilots and Dispatchers have. I've had more problems with the Maintenance Supervisor trying to get me to take an airplane than I've had Dispatchers saying it's OK to go."

> Dispatcher: "If the crew were to contact Maintenance directly, Maintenance Controllers sometimes tend to have a different set of priorities than the

> Dispatch office, because we're trying to look at a lot of different options. In this case an option may depend on crew availability, maintenance facility. ... It might be to bring the airplane back to someplace other than where it took off. Maintenance facility and crew availability and all this stuff is beyond the scope and awareness levels of the Maintenance folks, and it seems to me there ought to be more of an emphasis on a standard procedure that you follow all the time irrespective of the severity of the item - be it a landing light or an anti-skid. Obviously there are different operational limitations, but the procedure ought to be the same no matter what the item is for consistency's sake because ... it's the exception that causes the problems."

This concern over a lack of perspective was further highlighted by the following discussion:

> Pilot: "In my airplane I'm used to taking off with 21 quarts if it's full and yet I can dispatch down to 16 quarts. What if I'm in flight and it now drops below 16 quarts? Do I have any guidance? No, there's not even a checklist for it. It doesn't even say crew awareness. It is not in the checklist if at all anywhere. If I call up Maintenance Control, and we get this in a training exercise and say: 'Well, my oil is 16 and still decreasing. Do you have any suggestions?' The suggestion was: 'Well, all we can tell you is to figure out your rate of loss and divide that into your time remaining, and if you have any oil left when you get there, continue. If you don't, divert.' What if it's a seal that's starting to go out and all of a sudden it's going to go whoosh? If I'd asked the same question of the Dispatcher, I think the Dispatcher would have come back and said: 'Ooh, sounds kinda scary. Why don't you turn around?'"
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> A Pilot suggested: "While the Maintenance people may have the technical answer to the question, ...they cannot typically put that answer into the context of a safe flight operation. So it's very common to have this kind of a response. Their entire focus and perspective does not include the kinds of safety issues that Pilots and Dispatchers are thinking about."

The above quotes focused on problems with the perspectives and priorities of Maintenance staff. Another problem that arose had to do with inconsistencies in the information provided to Maintenance and the information provided to flight crews.

> Pilot: "We have a problem [at our airline]. Maintenance has different limits than the Pilots do. The Pilots have an oil leak and you don't want to go. Maintenance says you can have so many drops per minute. There are different minimums between some of our Maintenance manuals and the manuals that we have, the limits in the book."

Thus, while Maintenance personnel do have some guidelines regarding safe performance characteristics for aircraft, these Pilots and Dispatchers were concerned

that those guidelines are sometimes incomplete or even contradictory. Perhaps more significant, though, is their concern over a lack of perspective among some Maintenance staff, and its potential to contribute to poor decision-making.

IV. Dispatcher Workload

The issue of Dispatcher workload was briefly mentioned earlier as a contributing factor affecting communication of important messages to the crew, and to incoming Dispatchers during shift changes. These concerns over Dispatcher workload are further highlighted by the following discussions.

> Pilot: "The very thing that happens when you end up with this crummy weather condition is everybody's trying to talk to the same Dispatcher at the same time. You're out of frequencies, you have no real support. It's the most time critical condition where you want the coordination. At the very least you want somebody to concur that I can put my ... DC10 at a gate in that place and they're going to have the ability to handle it, when, in fact, everybody shows up and it's a parking lot."
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> Pilot: "The other piece of that problem is information overload. The very thing we're talking about with your 12 foot ... piece of information, paper that comes to the cockpit crew at the pointy end of the operation. But it's 60 times as big for the Dispatcher who's working these 60 flights."
>
> Pilot: "The thing that I see is the Dispatchers doing 60 flights, they miss stuff. I see the Dispatchers missing a tremendous amount of things. [For instance, a plane may have] one pack inoperable and still you're going to 37 [37,000 feet] rather than flight planning at 25 [25,000 feet] or something like that [because the Dispatcher hasn't noticed this problem]."
>
> "We had a large [weather] complex coming into one of our major hubs, ... that field suddenly closing due to a large thunderstorm system moving through. We now have 40 or 50 airplanes circling, waiting to go into [that airport]. We're all theoretically on paper assigned an alternate, but we all can't fit into [that alternate], and now its a matter of one or two Dispatchers trying to work with each and every one of these airplanes, trying to assign an operationally appropriate location. [In this case] all the Captains up there [were] getting anxious, their fuel situations getting critical, trying to make decisions themselves where they need to go ... We had airplanes suddenly show up at the gate at an airport that we never even knew that they were coming as a result of that."

These comments reflect the fact that Dispatchers often work with many flights in a short period of time. Particularly when there is some broad disturbance, such as a large weather system, the resulting workload may become excessive.

V. Summary

This focus group served to identify a number of areas for possible improvements in the interactions of airline Pilots and Dispatchers. Many of these focused on communication problems, and dealt with concerns over the ease of establishing communication links, the inclusion of Dispatchers in important discussions with flight crews, communication between Dispatchers across shift changes, and the content and format of messages. Two related areas of concern, training and Dispatcher workload, also arose.

Potential Future Activities

Based on the concerns raised, several possible directions for further investigation have been identified which would support the development of FAA advisory circulars, indicate methods for improving the training of Pilots and Dispatchers, identify areas for improving operational procedures used by Pilots and Dispatchers, and guide the development of support tools. They include:

1. Documenting in greater detail the various methods of communication used by different airlines and aircraft, and assessing their effectiveness;

2. Identifying methods to assure communication of important messages:

   A. On the crew's flight plan;
   B. Between incoming and outgoing Crews;
   C. Between Dispatchers during shift changes;

3. Identifying situations where information is not communicated in a timely fashion and evaluating alternative solutions to deal with these situations;

4. Further studying the variety of factors that contribute to a tendency for some Pilots to choose to not talk to their Dispatchers in some cases;

5. Completing a more detailed study of weaknesses in the current training of ATC staff, Dispatchers, Pilots, and Maintenance;

6. Dealing with the use of unclear abbreviations and acronyms;

7. Assessing the impact of Dispatcher workload on Pilot-Dispatcher interactions.

Conclusion

As discussed above, the results of this focus group identified a number of problem areas. For some, the candidate solutions can easily be identified. For others, further research is required to understand the problem better and to evaluate alternative solutions. While some of these solutions undoubtedly involve the use of technology, it is also important to consider the effects of training and procedures on interpersonal relationships and group dynamics, and the resultant effects on communication and decision-making. To emphasize this point, one participant indicated that at his airline, Pilots are always required to talk with their Dispatchers prior to takeoff. He went on to discuss the value of such interactions:

> "The most effective link, according to most of our Captains now, is to make that initial call. When you show up at the airport, you talk to the guy you're going to be working with, your Dispatcher, even though it adds to his workload at that moment in time for what might be a nonessential communication. But it might be the most important thing you have. You just make it routine."

Thus, when investigating questions such as alternative methods of communication or improvements in training, it will be important to consider not only issues dealing with system design and applications of technology, but also issues concerned with enhancing cooperation and understanding between Dispatchers and Pilots.

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